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THE
OPERATIVE TREATMENT OF GENU VALGUM.

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THE following history illustrates, in a bad case of knock-knee, a means of treatment hitherto untried, but which yielded on both legs results so perfect as to warrant its being recommended in similar cases.

The patient, D. G., a male, aged 18, was admitted into the Aberdeen Infirmary on the 19th of April 1876. His occupation was that of a moulder in an iron foundry, and his account of the commencement and progress of his disease was as follows:—When six years of age, he had an attack of typhus fever, followed by general weakness, most marked in his lower limbs. After a time he noticed a deformity in his knees, which became bent inwards, and the deformity has been steadily increasing up to the present time. Until his tenth year he remained pale, delicate, and weak, but with no definite ailment save in his knees, and without any noticeable deformity elsewhere. Since his tenth year his general health has been very good.

Appearance on Admission.—His general appearance is that of a robust, strongly muscular, and well-nourished lad, but whose growth has been stunted. The deformity of his lower extremities immediately attracts attention. When upright, or lying on his back with the limbs straight, the knees fall inwards so as to knock against each other, and one knee has to be placed behind or before the other, to enable him to stand. If his feet are placed together,

the right knee crosses completely over to the left knee, and *vice versa*, so that a hand can be passed through between the transposed knees. When he walks, he drags the posterior knee from behind its fellow, makes it circumnavigate the latter, and finally come entirely in front of it, before the weight of the body is transferred from the one to the other. The normal slightly outward direction of the tibia is so exaggerated that, when lying on his back, the right leg, in the extended position, forms an angle of 150° with the right thigh, and the left leg an angle of 160° with its thigh. When standing the deformity is greater, owing to the superincumbent weight. In each femur the internal condyle is much elongated, while the external condyle is of normal length, but has its anterior surface so far absorbed that the patella is no longer retained in position, but is displaced outwards, and rests on the outer surface of the femur, with its inner and outer edges directed respectively forwards and backwards. Both patellæ, especially the right, can be pressed inwards to near their normal positions, but immediately slip outwards again. Both lower limbs seem shorter than normal, and on standing the biceps tendon is abnormally rigid and prominent in each.

When the knees are flexed to somewhat more than a right angle, the deviation outwards of the legs completely disappears, and it is easy to recognise by sight and touch that the internal condyles are elongated to between half and three-quarters of an inch. In this position, too, the patellæ are drawn still further backwards, so that they come to rest, not on the femur, but on the outer tuberosity of the tibia; and on the front of the femur the groove between the two condyles can be felt.

There exists a knotty thickening of the lower extremities of the tibiæ, fibulæ, radii, and ulnæ. The clavicles are unusually curved. The upper part of the sternum is very prominent, and the anterior ends of the ribs are enlarged close to their articulations with the costal cartilages. The spine is somewhat excurved in the lumbar region. The health is otherwise perfect.

This deformity was treated for some time by splints and bandaging, until it became evident that such means were utterly futile, and that nothing but an operation could straighten the limbs.

In a somewhat similar case, Mr Annandale had recently, in the Edinburgh Infirmary, opened the joint and sawn off the elongated part of the internal condyle under carbolic spray and antiseptic precautions. In the above case, however, it was decided to avoid the large opening into the joint, and substitution of a sawn surface for a smooth cartilaginous facet (both unavoidable in Mr Annandale's operation), by making subcutaneously an oblique division of the elongated condyle, fracturing it off as it were, so that it might be pushed higher up into its normal relation to the outer condyle, and there allowed to unite. It was plain that this should permit

the limb to become at once straight, since the elongation of the condyle was, as it were, the essence of the deformity. The following operation was therefore decided upon, and put into practice, on the 17th May 1876, on the left knee:—

The patient was chloroformed, the knee flexed as far as possible, and the thigh turned outwards. A long and strong tenotomy knife (Adams's) was introduced through the skin, three and a half inches above the tip of the internal condyle on the inner side of the thigh, and so far back as to be opposite the ridge of bone running between the linea aspera and the condyle. Its blade was carried forwards, downwards, and outwards, over the front of the femur, with its cutting edge directed to the bone. When its point could be felt under the skin, in the groove between the condyles where the patella would normally have been lying in the flexed position of the limb, the cutting edge was pressed against the bone, and the soft parts and periosteum divided by one slow firm movement in withdrawing the knife. The external wound thus made was about one third of an inch long, and formed the entrance to a subcutaneous tunnel, running obliquely over the front of the femur, and ending in the cavity of the joint. Adams's saw for subcutaneous division of the neck of the femur was introduced into the tunnel, and the condyle sawn off by directing the edge of the saw straight backwards. The position of the saw could be exactly controlled by feeling its point working gradually backwards in the groove between the condyles. As soon as it was estimated that the condyle was almost entirely separated, and that the saw had arrived near the popliteal space, the saw was withdrawn. The knee was completely extended, and then with the hands, and the operator's knee as a fulcrum, the patient's knee was forcibly straightened by bending the leg inwards. The remaining connexions of the condyle with the femur gave way with a crack on the application of very moderate force, and instantly the leg became as straight as a healthy limb, and could even be put into a somewhat bandy (*genu varum*) position. *The whole of the operation was conducted under carbolic spray, with a minute observance of Lister's antiseptic precautions, and the limb was put up in antiseptic dressings.* It was then simply bandaged to a Liston's long splint, as in the drawing, the thigh and leg being kept in the same line by pads, and the boy was placed upon a hard mattress.

The reaction was almost *nil*. His temperature, carefully taken, never rose above 99·8°. The joint, at first filled with blood, never became hot or tender, and on the 2d June the splint and bandages were discontinued and passive motions commenced.

On the 6th June, the other knee was operated on in the same manner, with an equally favourable result, the temperature never rising above 100°. The splint and bandages were removed on the 21st June, and passive movements commenced.

The movements were continued on both limbs for a month, and were at first attended by crackling and grating, as if from rough or displaced cartilages, whenever the knees were flexed to a right angle. There was never any pain, and the movements became steadily smoother until, on the 9th July, seven and a half weeks after the operation on the left knee, and less than five weeks after that on the right knee, he was allowed to rise and walk. The movements speedily became normal, and he was dismissed, walking perfectly, on the 21st July. The patellæ were even then tending to assume a more normal position.

I am indebted to Mr James Gordon, student of medicine, Aberdeen, for the beautiful sketch of the boy after the first knee had been straightened.